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ALTERNATIVE FUELS SESSION SUPPLEMENT for INNOVATION WORKSHOP

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Supplement

- **Provided as a read-ahead for attendees in addition to other materials**
- **Provides draft set of assumptions**
  - Assumptions helpful in establishing working level dialogue on the needs and the possible technology solutions to address them
  - Need critical review of assumptions by a diverse body of stakeholders/experts
    - > Use Alternative Fuels Session of Innovation Workshop, July 2009 as an initial forum to review and refine initial list of assumptions
    - > Expand review of these assumptions post-workshop and devise a plan for regular review and implement
- **Provides proposed baseline metrics for fuels as an energy supply**
- **Provides two key approaches to identifying vehicle / fuel technologies that involve or impact fuels used in tactical vehicles in the near, mid, and far term (2014, 2024, 2030)**

Assumptions for Tactical Vehicles

A draft set of assumptions regarding the types of tactical vehicles (ground focus) and their power plants in the near, mid, and far term (2014, 2024, 2030) relative to vehicle-centric power needs.

- **Compression Ignition (CI) engines remain dominant in propulsion systems of tactical vehicles at least through 2030**
  - Significant portion of current DoD/Army equipment with CI engines will remain in-service at least through 2030
  - CI engines continue to prevail in propulsion systems of newly-fielded tactical/combat vehicles such as hybrid-electric vehicles, unmanned ground vehicles, etc., at least through 2030
- **CI engine technologies will continue to evolve through 2030**
  - Combustion regimes and controls, including emissions compliance hardware
  - Subsystem level fuel-wetted components (e.g., fuel injection systems, etc.)

Assumptions for Fuels
(Slide 1 of 2)

A draft set of assumptions regarding fuels for use in tactical vehicles (ground focus) and their power plants in the near, mid, and far term (2014, 2024, 2030) relative to vehicle-centric power needs.

- **DoD/Army generally adheres to Single Battlefield Fuel (SBF) Policy***
  - Majority of current tactical equipment is still capable of using SBF despite fact most engines therein were designed to operate with diesel fuel
  - Army will modify commercial engines, as needed, to enable continued adherence to Single Battlefield Fuel Policy
  - Diesel fuel is important as alternate fuel if jet fuel is not available
- **SBF (JP-8 / JP-5 / Jet A-1) remains widely available**
  - Jet fuel continues to be produced in many regions worldwide to highly harmonized specs generally meeting requirements of SBF
  - Displacement/replacement of some petroleum-derived jet fuel will occur with non-petroleum derived jet fuel entering fuels supply, typically as blends (with petroleum-derived jet fuel)

*** SBF Policy states "Current tactical/combat equipment are required to operate with jet fuel (JP-8/JP-5/Jet A-1+additives) as directed by the Single Fuel in the Battlefield Policy."**

Assumptions for Fuels
(Continued – Slide 2 of 2)

A draft set of assumptions regarding fuels for use in tactical vehicles (ground focus) and their power plants in the near, mid, and far term (2014, 2024, 2030) relative to vehicle-centric power needs.

- **Alternative fuels continue to emerge worldwide as production gradually increases through 2030 and beyond**
  - Many (E85, B20, CNG, etc.) will not be suitable for use in tactical vehicles / fuel infrastructure
  - Quality may become more variable as locally-produced alternative fuels enter fuels supply
    - > Some properties not limited in specs (e.g., Cetane No. in MIL-DTL-83133)
- **Alternative fuels are not approved for use in tactical equipment unless their quality is sufficient to ensure they are**
  - Stable for use after indeterminate storage periods
  - Freely interchangeable with existing SBF
  - Compatible with equipment, incl. fuel storage, distribution, and handling
  - Use in engines results in acceptable level of power generation, performance and durability

Baseline Metrics for Fuels as an Energy Supply

Proposed baseline metrics for the consideration of fuels as an energy supply for tactical vehicles (ground focus) and their power plants in the near, mid, and far term (2014, 2024, 2030) relative to vehicle-centric power needs.

- **Applicable to petroleum and alternative fuels**

Proposed Baseline Metrics

- **Availability**
  - Is fuel widely available worldwide?
    - > Produced in numerous locations, distributed and available for purchase or offered in response to bid for supply contract
- **Accessibility**
  - Is fuel accessible to user at/near point of use when it is needed?
- **Acceptability**
  - Does fuel have sufficient level of quality to make it suitable for use in all intended equipment?
    - > When used in systems/components where it is stored, distributed, handled, or consumed, acceptable levels of performance and durability are maintained

Identifying Vehicle / Fuel Technologies

Two key approaches to identifying vehicle / fuel technologies that involve or impact fuels used in tactical vehicles (ground focus) and their power plants in the near, mid, and far term (2014, 2024, 2030) relative to vehicle-centric power needs.

Vehicle Technologies

Fuel Technologies

Vehicle / power plant and fuel as a system provide needed power and energy.